WHAT IS CLAIMED IS:

1. In a method of removing noise from a digital image, comprising the steps of:

a) receiving an original digital image including a plurality of pixels;

b) generating at least one residual digital image and at least one base digital image from the original digital image, the base digital image having a lower spatial resolution than the original digital image; and

c) generating a noise reduced base digital image by removing noise from the base digital image with a noise reduction filter so that when the noise reduced base digital image is combined with the residual digital image to produce a reconstructed digital image, noise is not present in the reconstructed digital image.

2. The method of claim 1 further including the step of:

d) using the residual digital image and the noise reduced base digital image to produce the reconstructed digital image.

3. The method of claim 2 wherein the reconstructed digital image has the same spatial resolution as the original digital image.

4. The method of claim 2 wherein the reconstructed digital image has a lower spatial resolution as the original digital image.

5. The method of claim 2 further including the step of further removing noise from the reconstructed digital image by using the noise reduction filter.

6. The method of claim 2 further including the steps of:

generating an interpolated base digital image by spatially filtering the base digital image with an interpolation filter; and

generating the residual digital image by combining the interpolated base digital image with the original digital image.

7. The method of claim 6 wherein combining the interpolated base digital image with the original digital image includes calculating the difference between the interpolated base digital image and the original digital image.

8. The method of claim 6 further including:

generating an interpolated noise reduced base digital image by spatially filtering the noise reduced base digital image with the interpolation filter; and

generating the reconstructed digital image by combining the residual digital image and the interpolated noise reduced base digital image.

9. The method of claim 8 wherein combining the residual digital image with the interpolated noise reduced base digital image includes calculating the addition of the residual digital image and the interpolated noise reduced base digital image.

10. The method of claim 2 wherein the generated base digital image is accomplished by spatially filtering the original digital image.

11. The method of claim 10 wherein the generated base digital image is accomplished by spatially filtering the original digital image using a two-dimensional Gaussian filter.

12. The method of claim 10 wherein the generated base digital image is accomplished by spatially filtering the original digital image using two one-dimensional Gaussian filters wherein the one-dimensional Gaussian filters are oriented in orthogonal directions to each another.

13. The method of claim 10 wherein the generated base digital image is accomplished by spatially filtering the original digital image wherein the spatial filtering step is applied to selected pixels of the original digital image.

14. The method of claim 13 wherein the selected pixels on which spatial filtering is performed on every other pixel of every other row of pixels of the original digital image.

15. The method of claim 1 wherein the noise reduction filter used to remove noise from the base digital image includes the steps of:

identifying a pixel of interest and a local neighborhood of pixels located about the pixel of interest;

calculating a difference pixel value for pixels in the local neighborhood of pixels based on the absolute difference between the value of the pixel of interest and the individual values of pixels included in the local neighborhood of pixels;

using the absolute difference pixel values to calculate a noise reduced pixel value; and

replacing the value of the pixel of interest with the noise reduced pixel value.

16. The method of claim 15 further including the steps of:

comparing the absolute difference pixel values to a threshold value; and

using only the values of pixels included in the local neighborhood of pixels for which the corresponding absolute difference pixel values are less than the threshold value to calculate the noise reduced pixel value.

17. The method of claim 16 wherein the threshold value is a function of the values of pixels included in the local neighborhood of pixels.

18. The method of claim 1 wherein the noise reduction filter is adaptive and changes in response to the signal content of the pixels values of the digital image.

19. The method of claim 1 wherein the noise reduction filter is a median filter.

20. The method of claim 6 wherein the interpolation filter is a bilinear interpolation filter.

21. The method of claim 6 wherein the interpolation filter is a bicubic interpolation filter.

22. The method of claim 1 wherein the original digital image includes a luminance component and two chrominance components.

23. The method of claim 22 wherein the noise filter is used to remove more noise from the chrominance components than the luminance component.

24. In a method of removing noise from a digital image, comprising the steps of:

a) receiving an original digital image including a plurality of pixels;

b) generating at least one residual digital image and at least one base digital image from the original digital image using wavelet filters or discrete cosine transform filters, the base digital image having a lower spatial resolution than the original digital image; and

c) generating a noise reduced base digital image by removing noise from the base digital image with a noise reduction filter so that when the noise reduced base digital image is combined with the residual digital image to produce a reconstructed digital image, noise is not present in the reconstructed digital image.

25. In a method of removing noise from a digital image, comprising the steps of:

a) receiving an original digital image including a plurality of pixels;

b) sequentially generating, starting from the original digital image, a plurality of residual digital images and a plurality of corresponding base digital images, respectively, wherein each base digital image has a lower spatial resolution than the previous digital image from which is was derived; and

c) generating noise reduced base digital images by removing noise from at least one of the base digital images with a noise reduction filter so that when the noise reduced base digital images are combined with corresponding residual digital images to produce reconstructed digital images, noise is not present in the reconstructed digital images.

26. The method of claim 25 wherein a first noise reduction filter is used to remove noise from one of the base digital images and a second noise reduction filter is used to remove noise from a different base digital image.

27. In a method of removing noise from a digital image comprising the steps of:

a) receiving an original digital image including a plurality of pixels;

b) noise filtering the original digital image to produce a noise reduced original digital image;

c) generating at least one residual digital image and at least one base digital image from the noise reduced original digital image, the base digital image having a lower spatial resolution than the noise reduced original digital image; and

d) generating a noise reduced base digital image by removing noise from the base digital image with a noise reduction filter so that when the noise reduced base digital image is combined with the residual digital image producing a reconstructed digital image, noise is not present in the reconstructed digital image.

28. The method of claim 27 further including the step of:

e) using the residual digital image and the noise reduced base digital image to produce the reconstructed digital image.

29. The method of claim 28 wherein the reconstructed digital image has the same spatial resolution as the original digital image.

30. The method of claim 28 wherein the reconstructed digital image has a lower spatial resolution as the original digital image.

31. The method of claim 27 further including the steps of:

generating an interpolated noise reduced base digital image by spatially filtering the noise reduced base digital image with an interpolation filter; and

generating the residual digital image by combining the interpolated noise reduced base digital image with the noise reduced original digital image.

32. The method of claim 31 wherein combining the interpolated noise reduced base digital image with the noise reduced original digital image includes calculating the difference between the interpolated noise reduced base digital image and the noise reduced original digital image.

33. The method of claim 32 wherein combining the residual digital image with the interpolated noise reduced base digital image includes calculating the addition of the residual digital image and the interpolated noise reduced base digital image.

34. The method of claim 28 wherein the generated base digital image is accomplished by spatially filtering the noise reduced original digital image.

35. The method of claim 34 wherein the generated base digital image is accomplished by spatially filtering the noise reduced original digital image using a two-dimensional Gaussian filter.

36. The method of claim 34 wherein the generated base digital image is accomplished by spatially filtering the noise reduced original digital image using two one-dimensional Gaussian filters wherein the one-dimensional Gaussian filters are oriented in orthogonal directions to each another.

37. The method of claim 34 wherein the generated base digital image is accomplished by spatially filtering the noise reduced original digital image wherein the spatial filtering step is applied to selected pixels of the noise reduced original digital image.

38. The method of claim 37 wherein the selected pixels on which spatial filtering is performed on every other pixel of every other row of pixels of the noise reduced original digital image.

39. The method of claim 27 wherein the noise reduction filter used to remove noise from the base digital image includes the steps of:

identifying a pixel of interest and a local neighborhood of pixels located about the pixel of interest;

calculating a difference pixel value for pixels in the local neighborhood of pixels based on the absolute difference between the value of the pixel of interest and the individual values of pixels included in the local neighborhood of pixels;

using the absolute difference pixel values to calculate a noise reduced pixel value; and

replacing the value of the pixel of interest with the noise reduced pixel value.

40. The method of claim 39 further including the steps of:

comparing the absolute difference pixel values to a threshold value; and

using only the values of pixels included in the local neighborhood of pixels for which the corresponding absolute difference pixel values are less than the threshold value to calculate the noise reduced pixel value.

41. The method of claim 40 wherein the threshold value is a function of the values of pixels included in the local neighborhood of pixels.

42. The method of claim 27 wherein the noise reduction filter is adaptive and changes in response to the signal content of the pixels values of the digital image.

43. The method of claim 27 wherein the noise reduction filter is a median filter.

44. The method of claim 31 wherein the interpolation filter is a bilinear interpolation filter.

45. The method of claim 31 wherein the interpolation filter is a bicubic interpolation filter.

46. The method of claim 27 wherein the original digital image includes a luminance component and two chrominance components.

47. The method of claim 46 wherein the noise filter is used to remove more noise from the chrominance components than the luminance component.

48. In a method of removing noise from a digital image comprising the steps of:

a) receiving an original digital image including a plurality of pixels;

b) noise filtering the original digital image to produce a noise reduced original digital image;

c) generating at least one residual digital image and at least one base digital image from the noise reduced original digital image using wavelet filters or discrete cosine transform filters, the base digital image having a lower spatial resolution than the original digital image; and

d) generating a noise reduced base digital image by removing noise from the base digital image with a noise reduction filter so that when the noise reduced base digital image is combined with the residual digital image to produce a reconstructed digital image, noise is not present in the reconstructed digital image.

49. In a method of removing noise from a digital image comprising the steps of:

a) receiving an original digital image including a plurality of pixels;

b) noise filtering the original digital image to produce a noise reduced original digital image;

c) sequentially generating, starting from the noise reduced original digital image, a plurality of residual digital images and a plurality of corresponding base digital images, respectively, wherein each base digital image has a lower spatial resolution than the previous digital image from which is was derived; and

d) generating noise reduced base digital images by removing noise from at least one base digital image with a noise reduction filter so that when the noise reduced base digital images are combined with corresponding residual digital images to produce reconstructed digital images, noise is not present in the reconstructed digital images.

50. The method of claim 49 wherein a first noise reduction filter is used to remove noise from one of the base digital images and a second noise reduction filter is used to remove noise from a different base digital image.

51. A computer storage medium having instructions stored therein causing a computer to perform the method of claim 1.

52. A computer storage medium having instructions stored therein causing a computer to perform the method of claim 24.

53. A computer storage medium having instructions stored therein causing a computer to perform the method of claim 25.

54. A computer storage medium having instructions stored therein causing a computer to perform the method of claim 27.

55. A computer storage medium having instructions stored therein causing a computer to perform the method of claim 48.

57. An image pyramid representation of an original digital image, comprising:

a) at least one noise reduced base digital image having lower spatial resolution than an original digital image wherein the base digital image has noise removed therefrom; and

b) at least one residual digital image so that when the noise reduced base digital image and the residual digital image are combined, they form a reconstructed digital image wherein noise found in the original digital image is not present in the reconstructed digital image.

58. A computer storage medium having instructions stored therein causing a computer to perform the method of claim 57.